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(54) **Title of Invention Device for Manufacturing Toy**

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Specification

1. Title of Invention

Device for Manufacturing Toy

2. Scope of Patent Claim

A device for manufacturing a toy in which multiple molding dies are disposed, with various indicated angles in between, on concentric circles centered on a rotating shaft; at the same time, an indicated die is formed at the position of the corresponding components to form respective articulating parts according to a predetermined formation sequence on the respective formation dies; a runner part for the component is formed between a core side which makes up this and other formation dies and a cavity side; it also has a stripper which allows it to turn freely in the shaft direction of the aforementioned rotation shaft so that it can move to the next formation sequence.

3. Detailed Description of Invention

[Industrial Field]

The present invention relates to a device for manufacturing toys which is provided with an articulated part and in particular provides a manufacturing device which makes possible integrated formation by using multiple formation processes which make it possible to connect a body part which comprises the articulated part of a doll, the leg parts, the arm parts and other main component parts.

[Description of the Prior Art]

Prior-art devices for manufacturing dolls have formed parts to split the front and back as well as the left and right sides by forming the doll's body part, leg parts, arm parts and other component parts using a synthetic resin. These parts were assembled by using respective screw catches using manual assembly steps. The indicated articulated parts were formed by connecting the mutual components using rivets and the like so that the parts could rotate freely.

[Problems Which the Present Invention Attempts to Resolve]

In the prior-art manufacturing device, the doll's body part, leg parts, arm parts and other component parts were formed respectively on the front and back and on the left and right hand sides. For example, even in the most restrained design, the doll was made up of five body parts, $5 \times 2 = 10$ leg parts and $4 \times 2 = 8$ parts. A total of at least 39 parts was required for integral assembly of the dolls including a total of 23 parts and 8 screws for assembly and 8 rivets and others. The prior art device was defective in that a large number of parts was required. The formation parts which related to one another for the articulated parts of the doll were defective in that it was difficult to form them uniformly by contraction during the formation steps under established formation conditions and these parts were assembled manually which made the assembly process quite cumbersome. A large number of assembly steps were required and the aforementioned problems in formation ensued even if quality control was carried out for each of the steps. There were also dispersions in the finished product no matter what steps were taken and manufacturing costs were prohibitively high.

[Means Used to Resolve These Problems]

The present invention has eliminated the defects in manufacturing seen in the prior-art manufacturing device and disposes multiple formation dies, with indicated angles in between, respectively on concentric circles centered around a rotation shaft. It forms the required dies at positions for the corresponding parts used to make up the respective articulated parts according to a predetermined formation sequence on the respective formation dies. It retains part of a runner for the parts formed between a core side which makes up these formation dies and a cavity side. It disposes a mounted stripper in the shaft direction of the aforementioned rotation shaft used to move to the formation die in the following formation sequence so that it can slide and rotate freely.

[Practical Embodiment of the Invention]

Next, we shall describe a practical embodiment of the present invention referring to the following figures. Figure 7 and Figure 6 are dolls to be manufactured in the practical embodiment of the present invention. This doll is made up of a body part 10, leg parts 20 and arm parts 30 as the main component parts which comprise the articulated parts. The body part 10 is made up of a head part 11, a chest part 12 and a waist part 13.

To explain the manufacturing steps for one leg part 20 as indicated in Figure 5, a shaft receiving member 21 which is connected to the runner 1a as indicated in Figure 5A in the first manufacturing step and makes shaft 21a protrude is used for mounting on the shaft receiving part 14 on the aforementioned back part 13. A foot part 22 which is provided with a protruding shaft 22a which is a member for one side which makes up the articulated part forms the reinforcement parts 23 and 24. Next, in the second formation step, an intermediate part 26 is inserted which is provided with (1) an intermediate part 25 which is joined to the runner 1b, as indicated in Figure B, and which encapsulates and retains the aforementioned shaft member 21 so that it can rotate freely and has a protruding shaft 25a on the other side; and (2) an intermediate part 26 which encapsulates and retains the aforementioned protruding shaft 22a so that it can rotate freely and which is provided with a protruding shaft 26a on the other side. It forms a [one character illegible] which is provided with protruding shafts 27a and 27b which are one member which makes up the articulated part of the [one character illegible] part. Next, in the third formation step, it is formed to make an integral piece which is provided with (1) a shaft receiving member 28 which encapsulates and retains the aforementioned protruding shaft 25a and protruding shaft 27a so that it can rotate freely; and (2) protruding shaft 22a and protruding shaft 27b and forms an integral piece by inserting shaft receiving side member 29 which encapsulates and retains these shafts so that it can rotate freely, as indicated in Figure C.

The component parts in the second formation step which serve as the latter sequence in this formation step have a melting point which is lower than that of the formation materials used in the first formation step and are formed using a formation material which has a high contraction rate. The formation parts in the third formation step which is the latter sequence have a melting point which is lower than that of the formation materials which are used in the second formation step which is in a prior sequence and is formed using a formation material which has a high contraction rate. The formation step which comprises this insertion formation

is carried out consecutively and continuously so that the main component parts which make up the aforementioned multiple articulated parts form an integral part.

Figure 2 is a frontal view of the important parts of the core side 2 on the formation device which is used to carry out the series of formation steps indicated above. In the figure, a first formation die 1x which is used in the aforementioned first formation step is disposed at a position x on a concentric circle which is centered on a rotation shaft 3. A second formation die 1Y which is used in the aforementioned second formation step is disposed at a position Y which rotates 120° from the same shaft 1x. A third formation die 1Z which is used in the aforementioned formation step is disposed at a position Z which rotates 120° from the same die 1Y. A die which is required at a position on the corresponding parts to make up the respective articulated parts is formed according to a predetermined formation sequence on the formation die.

Figure 1 is an exploded inclined view of the important parts of the aforementioned formation device. In the same figure, 1 is a cavity on the formation die which corresponds to the aforementioned core 2. It is used as a means for moving to the formation die which is located at the next formation sequence the parts which are formed as indicated above between the aforementioned cavity 1 and core 2 which face it. A stripper 4 is provided with the aforementioned rotation shaft 3 and retains one end of the aforementioned runner 1a so that it can rotate freely and in the shaft direction. An ejection pedestal which is provided with an ejection pin 5a is disposed on the back side of this core 2. This core 2 and this ejection pedestal 5 are mounted so that they can slide freely in the shaft direction via a spring 6b along multiple guide pins 6a which are set so they protrude onto pressing pedestal 6 which is opposite a pressing device. A hooking pawl 7 which protrudes three ways so that it can turn this at an indicated angle, that is, 120°, is disposed on the aforementioned rotation shaft 3. A guide frame 8 which retains this so that it can turn freely and which is provided with a hydraulic device 8a on one side is disposed on the outside. A half-moon shaped guide groove 8b which is used to guide to the aforementioned hooking pawl 7 an operating shaft 9 which is disposed on the piston shaft of the aforementioned hydraulic device so that it can turn freely when pressed, is formed inside the same guide frame 8.

[Operations]

Next, we shall explain the operations for each of the formation steps which make use of the formation device mentioned previously by referring to Figure 3 and Figure 4. Here, a core 2 side adheres tightly to the cavity 1 side indicated in a of Figure 3. A part 1c which is formed in a step in the previous sequence is inserted so that it connects to runner 1a inside the die. Injection molding takes place inside the die in this state so that a portion of the part 1c in the formation step of the previous sequence is inserted and formed to make an integral part using the formation part 1d in the latter sequence. Next, the cavity 1 is detached from the core side 2, as indicated in b in the same figure. A stripper 4 and an ejection pin 5a which forms an integral piece with the ejection pedestal 5 is pressed out via the ejection pedestal 6 and the rotation shaft 3 by pressing and operating the pressing device, as indicated in c in the same figure. The aforementioned formation parts 1c and 1d are removed from the die on the core 2 side so that they form an integral piece with the aforementioned stripper 4. Next, in Figure 4d, when the stripper 4 is continuously pressed out, the ejection pin 5a becomes left behind, the stripper 4

becomes separated from the ejection pin 5a and goes into rotation mode. Next, in e in the same figure, the aforementioned hydraulic device 8a is operated and the stripper 4 is rotated at the indicated angle, that is, at 120°, via the aforementioned operating shaft 9, the hooking pawl 7 and the rotation shaft 3. As a result, the aforementioned formation parts 1c and 1d which are formed using the die at this position move to the formation die at the latter position while being retained on the aforementioned stripper 4. Meanwhile, the formation part 1c which has again been formed in the step in the previous sequence as was the case above is sent as the stripper 4 turns and is positioned on the same die. Next, the aforementioned pressing device moves back as indicated in f in the same figure, the stripper 4 is positioned at the core 2, the formation part in the step in the aforementioned prior sequence is guided onto the die and is [one character illegible]. Next, we shall describe the condition in a in the aforementioned Figure 3 and injection molding is carried out in the same way.

Formation is carried out continuously in each of the aforementioned formation dies by repeating the aforementioned operations. As a result, the parts formed at the formation die 1x at the position x in Figure 2 are guided to the formation die 1Y on the position Y as the aforementioned stripper 4 rotates. It is further guided to the formation die 1Z at the position Z as the stripper 4 rotates and the remaining part is inserted and formed so that it forms an integral part. Last of all, it is removed as a completed part for the main component parts which comprise the articulated parts. At the same time, each of the runners is cut away from the formation parts by using a runner excision device which is not shown in the diagrams.

[Effectiveness of the Invention]

By continuously carrying out (1) a prior sequence formation step which forms one of the members used to make up the articulated parts and others; and (2) multiple insert formation steps which form the other member which forms a pair with the previous member, as indicated above, the body part of the doll, the leg parts, the arm parts and other main component parts which comprise the articulated parts in the present embodiment of the invention can be formed to make an integral piece. When this is used, it is no longer necessary to form a great many individual parts and assemble them. The number of parts and the steps used to assemble them can be greatly reduced and the manufacturing costs can be greatly reduced.

In particular, multiple formation dies are disposed, at indicated angles, on a concentric circle which is centered on the rotation shaft. The indicated die is formed according to a predetermined formation sequence on the respective dies. A stripper is disposed so that it can slide and rotate freely in the shaft direction of the aforementioned rotation shaft. A portion of the runner for the parts which are formed at the respective positions is retained and can be moved precisely to the formation die in the next sequence by using a simple moving means which accompanies the upward and downward motions as well as the two-stage operation of the rotation shaft. This makes it possible to simplify the formation device which carries out multiple insert formations continuously. It also makes it possible to form the parts using continuously stabilized operations.

By forming multiple continuous inserts as indicated above, a completed product with continuously stable quality can be formed without any of the dispersions in the products which were caused by the deficiencies in the prior-art dies.

4. Brief Explanation of Figures

Figure 1 is an exploded inclined view of the important parts of the toy manufacturing device in a practical embodiment of the present invention. Figure 2 is a plane view of the important parts of the same formation device. Figure 3 and Figure 4 are lateral views of the important parts of the formation device which indicates how each of the parts operates in the formation steps in the same formation device. Figure 5 is an explanatory view of each of the formation steps for the leg parts in the same device. Figure 6 is a cutaway frontal view of the important parts of the doll. Figure 7 is a cutaway lateral view of the important parts of the doll.

In the figure, 1 is the cavity; 2 is the core; 3 is the rotation shaft; 4 is the stripper; 5 is the ejection pedestal; 6 is the pressing pedestal; 7 is the hooking pawl; 8 is the guide frame; 9 is the operating shaft; 1x is the first formation die; 1Y is the second formation die; 1Z is the third formation die; 1a and 1b are the runners; 10 is the body part; 20 is the leg part; and 30 is the arm part.

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Figure 1

Figure 2

Figure 3

(A)

Figure 4

(B)

(C)

Figure 5

Figure 6

Figure 7

APPARATUS FOR MANUFACTURING TOY

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Abstract

PURPOSE:To carry out successively the insert molding of a plurality of constituting parts, by providing a stripper set on a rotary shaft in freely sliding and rotating manner for holding a part of the runner of the parts molded in between a core and a cavity constituting a mold and for transfering it to the mold of the next molding order.
CONSTITUTION:The cavity 1 and the core 2 are tightly contacted and the parts 1c having being molded in the former order and being connected to the runner 1a are loosely inserted in the mold. Through injection molding into the same mold under this condition, a part of the part 1c having been molded in the former molding process is monolithically insert-molded with a part 1d molded in the latter order. The cavity 1 is then separated from the core 2 side and a projected plate 5 and monolithically molded parts 1c, 1d are thereafter separated with a stripper 4. They are transferred to the next molding process by being holded by the stripper 4 and the post forming is successively carried out.

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⑤4発明の名称　玩具の製造装置

⑳特　願　昭60－190484

㉒出　願　昭60(1985)8月29日

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明　細　書

1．発明の名称

玩具の製造装置

2．特許請求の範囲

回転軸を中心として同心円上に夫々所定角度をおいて複数の成形型を配置するとともに、夫々の成形型には予め定められた成形順位にて、夫々個別部等を構成するための対応する部品の位置に所望の型を形成してなり、かつこれ等の成形型を構成するコア側とキャビティ側の両には成形される部品のランナの一部を保持して次の成形順位の成形型に移送するための上記回転軸の軸方向に回動自在、ならびに回動自在に係止したストリッパを設けてなることを特徴とする玩具の製造装置。

3．発明の詳細な説明

「産業上の利用分野」

本発明は頭部胴部を具えた玩具の製造装置に関し、とくに人形の関節部を含む胴部、四肢、頭部等の主要の構成部品を連続する複数の成形工程によって一体成形を可能とする製造装置を提供するものである。

「従来の技術」

従来の人形の製造装置は人形の頭部、四肢、胴部等の各構成部品を合成樹脂の成形等により、夫々前後もしくは左右の分割部品として成形するものであり、これらの部品は人手による組立工程によって夫々ビス止めによって組合し、さらにリベット止め等によって相互の部品を回動自在に連結することによって所望の関節部を形成していた。

「発明が解決しようとする問題点」

しかし上記従来型の製造装置によると、人形の頭部、四肢、胴部等の各構成部品を夫々前後もしくは左右の分割部品として成形しているので、例えば最も控えめに計算しても頭部で5個、四肢で5個×2－10個、胴部で4×2－8個からなり、これらの成形部品が計23個、組立のためのビス8個、リベット8個等により、人形を一体組立るのに少なくとも総計39個の部品が必要で、極めて多くの部品点数が必要である等の欠点を有し、またこれら人形の関節部等の相互に連通した成形部品

は成形品の収縮等によって、定められた成形条件の下で同一に成形されることは困難である等の欠点を有し、さらにこれらの部品は人手によって一々組立ているので組立が極めて面倒であり、組立工数が多くかかるとともにその工程の品質管理を充分行なったとしても上記成形上の問題とも関連してどうしても仕上り製品にバラツキが生じ、製造コストが高価となる等の欠点を有していた。

「問題点を解決するための手段」

本発明は上記従来の製造装置による製造上の欠点を除去するもので、回転軸を中心として同心円上に夫々所定角度をおいて複数の成形型を配置するとともに、夫々の成形型には予め定められた成形順位にもって、夫々隣接部等を構成するための対応する部品の位置に所望の型を形成してなり、かつこれ等の成形型を構成するコア側とキャビティ側の両には成形される部品のランナの一部を保持して次の成形順位の成形型に移送するための上記回転軸の軸方向に移動自在、ならびに回動自在に装着したストリッパを設けてなるものである。

「実施例」

以下図に示す一実施例について本発明を説明すると、第6図、第7図は本発明の実施例において製造しようとする人形であって、この人形は胴部を主な主要な構成部品として頭部10、腕部20、脚部30からなり、また頭部10は夫々回動自在に連結される頭部11、胴部12、脚部13等からなる。

かかる人形の製造工程において、第5図に示す一方の腕部20の製造過程に沿って説明すると、まず第1の成形工程において第5図Aの様にランナ1aに連なり上記胴部13の軸受け部14に連結するための軸21aを突設した軸部材21と、胴部を構成する一方の部材となる突出軸22aを具えた足部22と、補強部材23,24を成形している。つぎに第2の成形工程において同図Bの様にランナ1bに連なり、上記軸部材21を回動自在に保持するとともに他方に突出軸25aを具えた中間部品25と、上記突出軸22aを回動自在に保持するとともに他方に突出軸26aを具えた中間部品26を夫々インサート成形し、かつその中間には腕部の胴部側を構成する一方の部材となる突出軸27a、27bを具えた胴部27を形成している。つぎに第3の成形工程において同図Cの様に上記突出軸25aと突出軸27aを夫々回動自在に保持する軸受部材28と、同じく突出軸22aと突出軸27bを夫々回動自在に保持する軸受け胴部材29をインサートにより一体的に成形している。

かかる成形工程において後順位となる第2の成形工程の成形部品はその先順位となる第1の成形工程に用いられる成形素材よりも融点が低く、収縮率の大きい成形素材を用いて成形される。またこれよりも後順位となる第3の成形工程の成形部品はその先順位となる第2の成形工程に用いられる成形素材よりも融点が低く、収縮率の大きい成形素材を用いて成形され、これらのインサート成形を含む成形工程が順次連続的に行なわれることによって、上記複数の胴部部品を胴部20等の主な構成部品を一体成形している。

第2図は上記一連の成形工程を行なうための成形装置のコア2側の型部正面図であって、回転軸3を中心として同心円上の位置Xに上記第1の成形工程に用いられる第1の成形型1xを設け、同型1xより120°回転した位置Yに上記第2の成形工程に用いられる第2の成形型1Yを設け、同成形型1Yよりさらに120°回転した位置Zに上記第3の成形工程に用いられる第3の成形型1Zを夫々設けている。かかる成形型には予め定められた成形順位にもって、夫々隣接部等を構成するための対応する部品の位置に所望の型を形成している。

第1図は上記成形装置の要部分解斜視図であって、同図において1は上記コア2に対応する成形型のキャビティで、同キャビティ1と対向するコア2の側には上記の様に成形される部品を次の成形順位にある成形型に移送するための移送手段として、上記回転軸3を具え回動自在ならびに軸方向に移動自在に上記ランナ1aの一端を保持するストリッパ4を設けている。またコア2の側には突出しピン5aを具えた突出し台5を設け、これらコア2および突出し台5は押圧装置に充なる押圧台6に突設した複数のガイドピン6aに沿ってス

プリング60を介して軸方向に回動自在に支持している。また上記回転軸3にはこれを所定角度、すなわち上記 120° づつ回動するための三方に突出した係合爪7を設け、その外側にはこれを回動自在に保持するとともに一側に油圧装置8aを具えた案内枠8を設置し、同案内枠8内に油圧装置のピストン軸に回動自在に設置した作動軸9を押圧時に上記係合爪7に係合するための半月状の案内溝80を形成している。

「作用」

以上のような成形装置を用いた成形工程の各部の動作を第3図および第4図に基いて説明すると、この場合、第3図のaにおいてキャビティ1側にコア2側が密着しており、かつその型内には先順位の工程において成形された部品1cがランナ1aにつながった形で保持されており、この状態で型型内に射出成形することによって後順位の成形部品1dによって先順位の成形工程の部品1cの一部を一体的にインサート成形することができる。つぎに同図bのほにキャビティ1が、コア2側より離れ、さらに同図cのほに押圧装置の押圧動作によって押圧台6、回転軸3を介してストリッパ4とともに突出し台5と一体の突出しピン5aが押出され、同ストリッパ4と一体に上記成形部品1c、1dがコア2側の型から離される。つぎに第4図のdのほにひき続きストリッパ4が押出されると、突出しピン5aがとり残された形となり、同ストリッパ4は突出しピン5aから離れて回転可能な状態となる。つぎに同図eにおいて上記油圧装置8aが作動して上記作動軸9、係合爪7、回転軸3を介して同ストリッパ4は所定の角度、即ち 120° 回動されることによって、この位置の型で成形された上記成形部品1c、1dは同ストリッパ4に保持された状態で後順位の工程の成形型上に移動する。一方上記と同様に先順位の工程で成形された新たな成形部品1cがストリッパ4の回動とともに送られて同型上に位置する。つぎにfのほに上記押圧装置が後退してストリッパ4がコア2側に位置するとともに上記先順位の工程の成形部品1cを型上に装着して位置する。以下上記第3図のaの状態となり同ほに射出成形が行なわれる。

以上のような動作の繰返しによって各成形型において夫々選択的に成形が行なわれる。しかして第2図における位置Xの成形型11で成形された部品は上記ストリッパ4の回動とともに位置Yの成形型12に案内されて中間部品等がインサート成形され、さらにストリッパ4の回動とともに位置Zの成形型13に案内されて残りの部分が一体的にインサート成形され、最終的に同部品を含む主要な構成部品の完成品として取出される。またこれとともにランナーは図示省略のランナー切除装置によって成形部品から切離される。

「発明の効果」

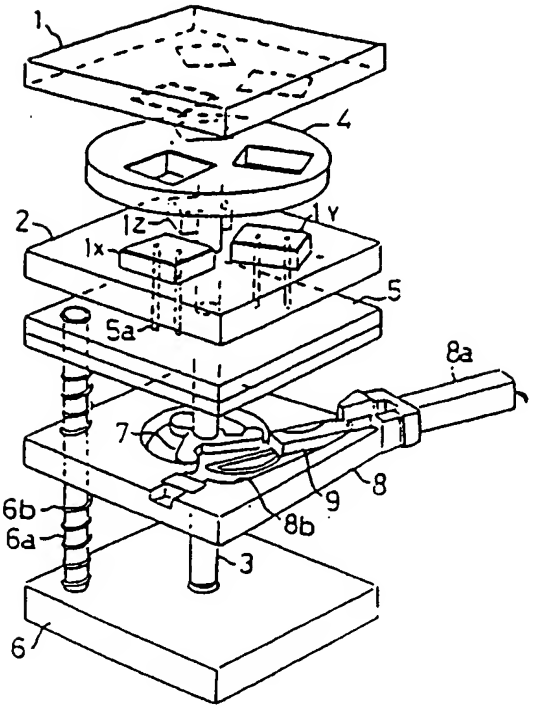
以上のように同部品等を構成するための一方の部材を形成する先順位の成形工程と、同部材と対となる他方の部材を形成する後順位の成形工程等からなる複数のインサート成形工程を選択的に行なうことにより、例えば実施例のような同部品を含む人形の頭部、胴、脚部の主要な構成部品を夫々一体成形することができる。これによっては従来型のような成形上の不具合による製品のバラツキがなくかに品質の安定した完成品を提供することができる。

4．発明の簡単な説明

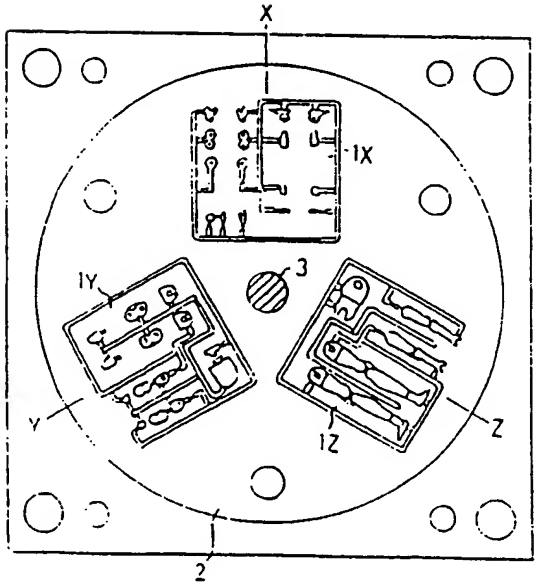
第１図は本発明の一実施例を示す玩具の射出成形機の要部分解斜視図、第２図は同じく成形装置の要部平面図、第３図、第４図は同じく成形工程における要部の動作説明用成形装置の要部断面図、第５図は同じく人形の脚部の各成形工程の説明用断面図、第６図は人形の要部切欠正面図、第７図は同じく人形の要部切欠側面図である。

図面中、１はキャビティ、２はコア、３は固定軸、４はストリッパ、５は突出し台、６は押圧台、７は係合爪、８は案内枠、９は作動軸、１ｘは第１の成形型、１Ｙは第２の成形型、１Ｚは第３の成形型、１８，１９はランナ、１０は脚部、２０は胴部、３３は頭部である。

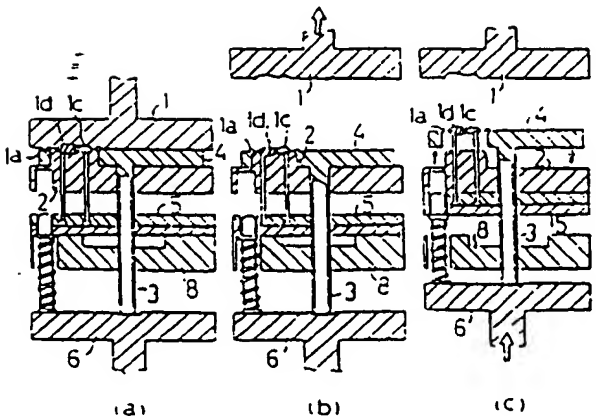
特許出願人　株式会社バンダイ



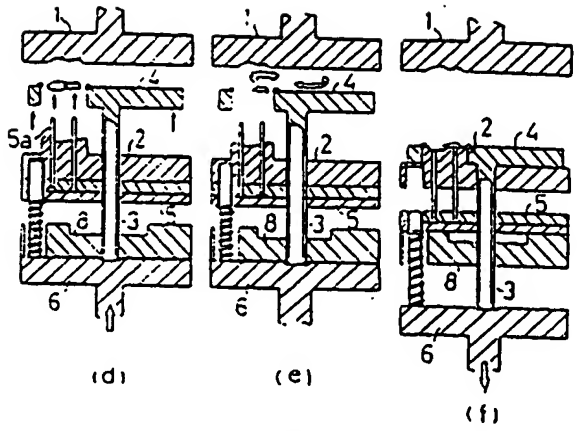
第１図



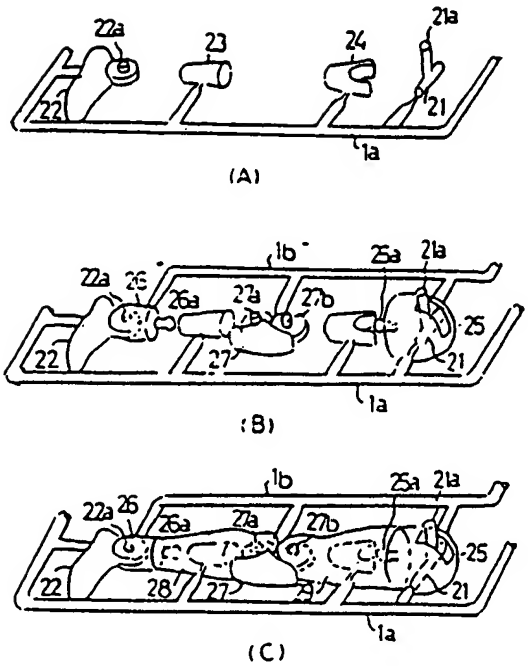
第２図



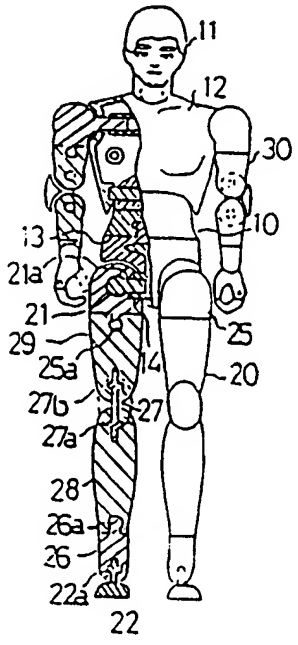
第３図



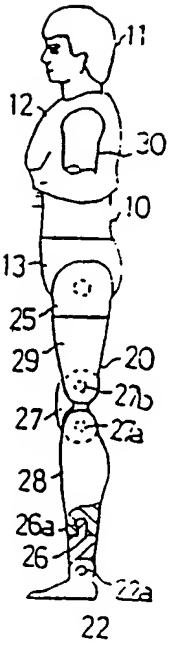
第4図



第5図



第6図



第7図